

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

Amendment and Response
Attorney Docket No. 1970024A
August 1, 2003
Page 2

AMENDMENTS TO THE CLAIMS

IN THE CLAIMS:

Claims 1 - 34 (previously cancelled).

35. (currently amended) A process for forming a polymer having at least one functionalized end group, the process comprising the [[step]] steps of:

(a) heating a mixture of an activated iodine reagent, a free-radical initiator, and at least one polymerizable monomer to form a pre-polymer, the activated iodine reagent being of the formula:

R-I

where R contains at least one radical stabilizing group and has 1-50 carbon atoms, the iodine and the radical stabilizing group are attached to the same carbon atom in R, and the radical stabilizing group is selected from the group consisting of an aryl, ester, amide, ketone, nitrile, halogen, and nitro; and

(b) functionalizing the pre-polymer by reaction with a nucleophilic reagent.

36. (canceled).

37. The process of claim 35 wherein the activated iodine reagent is one selected from the group consisting of iodoacetonitrile, ethyl 1-iodopropionate, 4-methylbenzyliodide and 1-iodo-ethylbenzene.

38. The process of claim 35 wherein the free-radical initiator is one selected from the group consisting of hydrogen peroxide, *t*-butyl hydroperoxide, *t*-butyl perbenzoate, *t*-amyl perbenzoate, *t*-butyl peroctoate, *t*-amyl peroctoate, ditertiary butyl peroxide, tertiary-amyl hydroperoxide, dibenzoyl peroxide, potassium persulfate and methyl ethyl ketone peroxide.

39. The process of claim 35 wherein the free-radical initiator is one selected from the group consisting of azobisisobutyronitrile, azobiscyanovaleric acid, azobis (hydroxethylcyanovaleramide), azobis (cyclohexanecarbonitrile), 2.2'-azobis (4-methoxy-2,4-dimethylvaleronitrile), 2.2'-azobis[2-methyl-N-(2-hydroxyethyl)propionamide].

40. The process of claim 35 wherein the monomer is one selected from the group consisting of styrene and substituted derivatives thereof, conjugated dienes and substituted derivatives thereof, acrylates and substituted derivatives thereof, acrylonitrile, acrylic acid and mixtures thereof.

41. (currently amended) The process of claim [[36]] 35 wherein the nucleophilic reagent is one selected from the group consisting of mercaptoethanol, thioglycolic acid, mercaptopropanol, thiopropionic acid, allyl mercaptan, and mercaptoethylamine.

42. The process of claim 35 wherein the heating is conducted in a solvent or in bulk.

43. The process of claim 41 wherein the solvent is one selected from the group consisting of toluene, amyl acetate, butyl acetate, pseudocumene, tetrahydrofuran, and dimethylformamide.

44. The process of claim 42 wherein the solvent is toluene.

45. The process of claim 35 wherein the iodine reagent is preformed or formed *in situ*.

46. The process of claim 35 wherein the polymerizable monomer is added to the mixture simultaneously, sequentially, batchwise or metered.

Amendment and Response
Attorney Docket No. 1970024A
August 1, 2003
Page 4

47. (currently amended) A process for forming a polymer having at least one functionalized end group, the process comprising the [[step]] steps of:

(a) heating a mixture of an activated di-iodine reagent, a free-radical initiator, and at least one polymerizable monomer to form a pre-polymer, the activated di-iodine reagent being of the formula:



where R contains at least one radical stabilizing group and has 1-50 carbon atoms, the iodine and the radical stabilizing group are attached to the same carbon atom in R, and the radical stabilizing group is selected from the group consisting of an aryl, alkene, ester, acid, amide, ketone, nitrile, halogen, isocyanate, nitro and amine; and

(b) functionalizing the pre-polymer by reaction with a nucleophilic reagent.

48. (canceled).

49. The process of claim 47 wherein the activated di-iodine reagent is α,α' -diiodoxylene or methyl 2,5-diiodohexanedioate.

50. The process of claim 47 wherein the free-radical initiator is one selected from the group consisting of peroxy compounds containing at least one O-O group.

51. The process of claim 47 wherein the free-radical initiator is one selected from the group consisting of azobisisobutyronitrile, azobiscyanovaleric acid, azobis (hydroxethylcyanovaleramide), azobiscyanovaleric acid, azobis (hydroxethylcyanovaleramide), azobis (cyclohexanecarbonitrile), 2.2' azobis (4-methoxy-2,4-dimethylvaleronitrile), 2.2'-azobis[2-methyl-N-(2-hydroxyethyl)propionamide].

Amendment and Response
Attorney Docket No. 1970024A
August 1, 2003
Page 5

52. (currently amended) The process of claim [[1]] 47 wherein the monomer is one selected from the group consisting of styrene and substituted derivatives thereof, conjugated dienes and substituted derivatives thereof, acrylates and substituted derivatives thereof, acrylonitrile, acrylic acid and mixtures thereof.

53. The process of claim 48 wherein the nucleophilic reagent is one selected from the group consisting of mercaptoethanol, thioglycolic acid, mercaptopropanol, thiopropionic acid, allyl mercaptan, and mercaptoethylamine.

54. The process of claim 47 wherein the heating is conducted in a solvent or in bulk.

55. The process of claim 54 wherein the solvent is one selected from the group consisting of toluene, amyl acetate, butyl acetate, pseudocumene, tetrahydrofuran, and dimethylformamide.

56. The process of claim 54 wherein the solvent is toluene.

57. The process of claim 47 wherein the iodine reagent is preformed or formed *in situ*.

58. The process of claim 47 wherein the polymerizable monomer is added to the mixture simultaneously, sequentially, batchwise or metered.

59. (canceled).

Claims 60 - 68 (previously canceled).

69. A process for forming a polymer having at least one functionalized end group, the process comprising the steps of:

Amendment and Response
Attorney Docket No. 1970024A
August 1, 2003
Page 6

- (a) heating a mixture of an iodine reagent having at least one iodine end group, a free-radical initiator, and at least one polymerizable monomer, the molar ratio of the free-radical initiator to the iodine reagent being 10 to 0.001, the molar ratio of the monomer to the iodine reagent being 10 to 1000; and
- (b) converting the iodine end group to the functionalized end group by reaction with a nucleophilic reagent.

70. The process of claim 69 wherein the monomer is selected from the group consisting of C₃-C₆ monoethylenically unsaturated carboxylic acids, and the alkaline metal and ammonium salts thereof. The C₃-C₆ monoethylenically unsaturated carboxylic acids include acrylic acid, methacrylic acid, crotonic acid, vinyl acetic acid, maleic acid, fumaric acid and itaconic acid.

71. (currently amended) The process of claim 69 wherein the iodine reagent is an activated iodine reagent of the formula:



where R contains at least one radical stabilizing group and has 1-50 carbon atoms, the iodine and the radical stabilizing group are attached to the same carbon atom in R, and the radical stabilizing group is selected from the group consisting of an aryl, ester, amide, ketone, nitrile, halogen, and nitro.

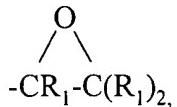
72. The process of claim 71 wherein the activated iodine reagent is one selected from the group consisting of iodoacetonitrile, ethyl 1-iodopropionate, 4-methylbenzyl iodide and 1-iodo-ethylbenzene.

73. (currently amended) The process of claim 69 wherein the iodine reagent is a functionalized iodine reagent of the formula:



where R contains at least one radical stabilizing group and has 1-50 carbon atoms, the iodine and the radical stabilizing group are attached to the same carbon atom in R, and the radical stabilizing group is selected from the group consisting of an aryl, alkene, ester, acid, amide, ketone, nitrile, halogen, isocyanate, nitro and amine, and

where Z_2 is selected from the group consisting of: [OR₁, N(R₁)₂, SR₁, COOR₁, COOM] -OR₁, -N(R₁)₂, -SR₁, -COOR₁, -COOM, olefin of the type -CR₁=C(R₁)₂, epoxide of the type



[SO₃M, PO(OR₁)₂, PO(R₁)₃, P(R₁)₃] -SO₃M, -PO(OR₁)₂, -PO(R₁)₃, -P(R₁)₃, -N=C=O and -CR₁=O, wherein R₁ is equal to H or a group having 1-20 carbon atoms, R₁ being the same or different for any Z_2 having more than one R₁, and wherein M is a metal ion.

74. (currently amended) The process of claim 69 wherein the iodine reagent is an activated di-iodine reagent of the formula:



where R contains at least one radical stabilizing group and has 1-50 carbon atoms, the iodine and the radical stabilizing group are attached to the same carbon atom in R, and the radical stabilizing group is selected from the group consisting of an aryl, alkene, ester, acid, amide, ketone, nitrile, halogen, isocyanate, nitro and amine.

75. The process of claim 74 wherein the activated di-iodine reagent is α,α' -diiodoxylene or methyl 2,5-diiodohexanedioate.

76. The process of claim 69 wherein the free-radical initiator is one selected from the group consisting of hydrogen peroxide, *t*-butyl hydroperoxide, *t*-butyl perbenzoate, *t*-amyl

Amendment and Response
Attorney Docket No. 1970024A
August 1, 2003
Page 8

perbenzoate, *t*-butyl peroctoate, *t*-amyl peroctoate, ditertiary butyl peroxide, tertiary-amyl hydroperoxide, dibenzoyl peroxide, potassium per sulfate and methyl ethyl ketone peroxide.

77. The process of claim 69 wherein the free-radical initiator is one selected from the group consisting of azobisisobutyronitrile, azobiscyanovaleric acid, azobis (hydroxethylcyanovaleramide), azobis (cyclohexanecarbonitrile), 2.2'-azobis (4-methoxy-2,4-dimethylvaleronitrile), 2.2'-azobis[2-methyl-N-(2-hydroxyethyl)propionamide].

78. The process of claim 69 wherein the monomer is one selected from the group consisting of styrene and substituted derivatives thereof, conjugated dienes and substituted derivatives thereof, acrylates and substituted derivatives thereof, and mixtures thereof.

79. The process of claim 69 wherein the nucleophilic reagent is one selected from the group consisting of mercaptoethanol, thioglycolic acid, mercaptopropanol, thiopropionic acid, allyl mercaptan, and mercaptoethylamine.

80. The process of claim 69 wherein the heating is conducted in a solvent or in bulk.

81. The process of claim 80 wherein the solvent is one selected from the group consisting of toluene, amyl acetate, butyl acetate, pseudocumene and tetrahydrofuran.

82. The process of claim 80 wherein the solvent is toluene.

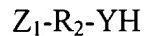
83. The process of claim 69 wherein the iodine reagent is preformed or formed *in situ*.

84. The process of claim 69 wherein the polymerizable monomer is added to the mixture simultaneously, sequentially, batchwise or metered.

Claims 85 - 108 (previously canceled).

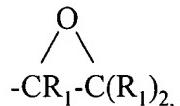
109. (new) The process of claim 35, 47, or 69 wherein said mixture in step (a) contains a base selected from ZnO, pyridine, 4-dimethylaminopyridine, diazabicyclo[5.4.0]undec-7-ene, K₂CO₃, K₃PO₄, NaHCO₃, basic alumina, triethylamine, and CaO, and 1,4-diazabicyclo[2.2.2]octane.

110. (new) The process of claim 35, 47, or 69 wherein said nucleophilic reagent is selected from a compound represented by the formula:



where Y is selected from the group consisting of oxygen, sulfur, and NR₅, where R₅ is hydrogen or a substituted or unsubstituted alkyl group or is not present when Z is directly bonded to the polymer, and

where Z₁ is selected from the group consisting of -OR₁, -N(R₁)₂, -SR₁, -COOR₁, -COOM, olefin of the type -CR₁=C(R₁)₂, epoxide of the type



-SO₃M, -PO(OR₁)₂, -PO(R₁)₃, -P(R₁)₃, -N=C=O and -CR₁=O, wherein R₁ is equal to H or a group having 1-20 carbon atoms, R₁ being the same or different for any Z₂ having more than one R₁, and wherein M is a metal ion.